



NCTIP

**National Center for Transportation and Industrial Productivity
New Jersey Institute of Technology**

To: Nick Vitillo

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**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Maturity Method in Prestressed Concrete Applications	
RFP Number:	NJDOT Research Project Manager: Tony Chmile
Task Order Number/Study Number: TO-53	Principal Investigator: Luke, Allyn C.
Project Starting Date: 01/01/2004 Original Project Ending Date: 12/31/2004 Modified Completion Date:	Period Starting Date: 4/01/2004 Period Ending Date: 6/30/2004

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Identify NJDOT Contact	5	100	100	5
Identify NJDOT Project	5	1	1	0.05
Identify NJDOT Prestress Plant	15	0	33	4.95
9 experiments	45	5	5	2.25
Quarterly and final reports	30	5	10	3
Final Report				
TOTAL	100 %			15.3 %

Project Objectives:

the concrete maturity method to prestressed concrete structures.

Project Abstract:

The concrete maturity method will be used to predict the strength of prestressed highway structures at critical times. Those times include when prestress load transfer can be accomplished, when the forms can be removed, when the item can be handled and transported, and placed, and finally to know if the structure is strong enough for its required use. Also, application of the maturity method to quality assurance will also be considered. A novel variation on ASTM C873 is introduced.

1. Progress this quarter by task:

Contact at NJDOT, tentative plant visits

2. Proposed activities for next quarter by task:

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

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Total Project Budget	\$74,148.00
Modified Contract Amount	
Total Project Expenditure to date	\$0.00
% of Total Project Budget Expended	0.00%

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Cost Benefit Analysis Modification to Project 2001-01, Computer Modeling and Simulation of New Jersey Signalized Highways	
RFP Number: 2003-01	NJDOT Research Project Manager: Karl Brodtman
Task Order Number/Study Number: TO-52	Principal Investigator: Chien, Steven I-Jy
Project Starting Date: 01/01/2004 Original Project Ending Date: 12/31/2004 Modified Completion Date:	Period Starting Date: 4/01/2004 Period Ending Date: 6/30/2004

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Task 1 Literature Review	10	80	100	10
Task 2 Benefit to Cost Analysis	70	10	10	7
Task 3 Development of Tutorial for the NJDOT Engineers	10	0	0	0
Final Report	10			
TOTAL	100 %			17.0 %

Project Objectives:

The research team at NJIT (currently conducting the NJDOT Project 2001-01) consisting of experienced/trained research members, will be responsible to achieve the following objectives:

- (1) Review, investigate, and summarize the state-of-the-art methodology for conducting cost and benefit analysis. The necessary data required for developing the proposed methodology will be identified.
- (2) Develop a cost model required for re-timing the signals at both studied segments.
- (3) Develop a benefit model to estimate the saving of road users' delay and vehicle operating cost as well as the mitigation of resulting environmental impact contributed from the re-timing of the signals.
- (4) Conduct cost and benefit analysis for both studied segments.

Project Abstract:

In order to continue its efforts to improve traffic flow through traffic signal enhancements, NJDOT is seeking to establish an on-going program to routinely update and upgrade traffic signals on key state highway corridors. While a number of research studies generally show significant benefits of signal optimization, NJDOT would require more specific cost justification in order to establish a regular, ongoing program for traffic signal upgrades. Therefore, NJDOT has requested that the preparation of a proposal to determine cost/benefit ratios of implementing recommended signal enhancements for the two study corridors.

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The purpose of developing a methodology and integrating simulation/optimization models to conduct the proposed cost and benefit analysis project for NJDOT Project 2001-01 is to provide a basis for the optimization of other non-interconnected signalized intersections in other areas throughout the State and aide in the reduction of traffic, congestion and congestion costs on the two studied roadway segments in NJDOT Project 2001-01.

1. Progress this quarter by task:

1. Literature review has been finished, while results will be summarized in a draft report for NJDOT review.
3. Developing models for calculating/converting simulation results (travel times, vehicle emissions, and fuel consumption) to monetary value.
2. Conduct before and after (cost/benefit analysis) study for Rt. 23 based on approved optimal singal timing directives.

2. Proposed activities for next quarter by task:

1. Continuing cost/benefit (C/B) analysis for Rt. 23
2. Producing tavbles and figures to summarize C/B analysis for Rt. 23
2. Conducting C/B analysis for Rt. 42/322

3. List of deliverables provided in this quarter by task (product date):

Draft report of literature review

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$80,283.00
Modified Contract Amount	
Total Project Expenditure to date	\$13,636.00
% of Total Project Budget Expended	16.98%

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Corrugated Steel Culvert Pipe Deterioration -Year II	
RFP Number: 2002 – 02	NJDOT Research Project Manager: Mr. Robert Sasor
Task Order Number/Study Number: TO-42	Principal Investigator: Meegoda, Jay N.
Project Starting Date: 1/1/2003	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2004	Period Ending Date: 6/30/2004
Modified Completion Date: 05/30/2005	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase I – Literature Search	9.5	0	100	9.5
Phase II – Task 1	6	0	100	6
Phase II – Task 2	6	0	100	6
Phase II – Task 3	6	5	65	3.9
Phase II – Task 4	6	0	100	6
Phase II – Task 5	6	0	100	6
Phase II – Task 6	9.5	5	45	4.275
Phase II – Task 7	6	10	10	0.6
Phase II – Task 8	15.0	10	10	1.5
Phase II – Task 9	15.0	5	45	6.75
Final Report	15.0	0	0	0
TOTAL	100 %			50.5 %

Project Objectives:

- (1) To develop a plan for implementing an effective, statewide, preventative maintenance program for CSCP so that pipe can be repaired and rehabilitated before failure occurs. In this way, instead of reacting to failures, NJDOT can be proactive in preventing failures.
- (2) To determine the best practice for using CSCP in new construction. In cases where it should not be used, recommend a type of pipe that can be used as a replacement.

Project Abstract:

- (1) To develop a plan for implementing an effective, statewide, preventative maintenance program for CSCP so that pipe can be repaired and rehabilitated before failure occurs. In this way, instead of reacting to failures, NJDOT can be proactive in preventing failures.
- (2) To determine the best practice for using CSCP in new construction. In cases where it should not be used, recommend a type of pipe that can be used as a replacement.

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1. Progress this quarter by task:

APPROXIMATELY 51%

Literature search, Phase II Tasks 1, 2, 4 and 5 completed.

Approximately 65% of Phase II task 3, 45% of Phase II task 6, 10% of Phase II task 7, 10% of Phase II task 8 and 45% of Phase II task 9 are completed.

Phase II Task 3 - Studied means of assessing the condition of CSCP, estimating pipe deterioration rates, and predicting service life for pipes in different parts of the state and with different uses. Developed predictive model and submitted technical paper to TRB. Executed Outside User Agreement with USEPA to allow use of their Edison Facility for flow testing of used CSCP. Purchased manometers for field tests. Picked up CSCP section for flow test instrumentation hook-up.

Phase II Task 6 - Study methods of inspection and maintenance record keeping and data storage used by other states. Review of available documents for recommendation.

Phase II Task 7 - Estimate the cost of the statewide preventative maintenance program. Prepare a justification for funding the program, which compares program costs to the savings realized from preventing pipe and roadway collapses and the ensuing traffic delays (user costs) and expensive roadway repair. Review of available documents for recommendation.

Phase II Task 8 - Recommend a framework for developing an effective, statewide, preventative maintenance program for CSCP. Meeting with NJDOT regarding incorporating the CSCP data into their database.

Phase II Task 9 - Determine the conditions for which CSCP should be used in new construction. The ICP system was purchased and completed preliminary tests before testing commenced. Picked up CSCP sections for ICP testing and removing the protective coats for testing.

2. Proposed activities for next quarter by task:

Phase II Task 3 - Study means of assessing the condition of CSCP, estimating pipe deterioration rates, and predicting service life for pipes in different parts of the state and with different uses. Perform hydraulic tests for old culverts.

Phase II Task 6 - Study methods of inspection and maintenance record keeping and data storage used by other states. Consider the benefits of storing CSCP pipe data in a centralized database, so that it could be easily accessed statewide to facilitate decision-making.

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Phase II Task 7. Estimate the cost of the statewide preventative maintenance program. Prepare a justification for funding the program, which compares program costs to the savings realized from preventing pipe and roadway collapses and the ensuing traffic delays (user costs) and expensive roadway repair.

Phase II Task 8 - Recommend a framework for developing an effective, statewide, preventative maintenance program for CSCP.

Phase II Task 9 - Determine the conditions for which CSCP should be used in new construction.

3. List of deliverables provided in this quarter by task (product date):

None.

4. Progress on implementation and training activities:

None

5. Problems/proposed solutions:

None

6. Budget summary:

Total Project Budget	\$214,614.00
Modified Contract Amount	
Total Project Expenditure to date	\$86,000.00
% of Total Project Budget Expended	40.07%

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QUARTERLY PROGRESS REPORT**

Project Title: Survey of Driver Perceptions of Railroad and Light Rail Warning Devices/Grade Crossings - Year II	
RFP Number: 2001-33	NJDOT Research Project Manager: Karl Brodtman
Task Order Number/Study Number: TO-33	Principal Investigator: Jeng, One-Jang
Project Starting Date: 1/1/2002	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2003	Period Ending Date: 6/30/2004
Modified Completion Date: 6/30/2004	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase I-Literature Search: Conduct a literature search of the current state of the practice	10	0	100	10
Phase II-Research Approach: Task 1: Determine the various types of railroad and light rail highway grade crossings in New Jersey	5	0	100	5
Task 2: Conduct a survey of other states for information	10	0	100	10
Task 3a: Catalog the individual active and passive railroad/light rail crossing devices in New Jersey	5	0	100	5
Task 3b: Arrange the devices in groups that would be found at typical crossings as found in the classification system in Task 1	5	0	100	5
Task 4: Setup of laboratory experimental tasks, video and still image editing, programming for recording subject responses and data processing	15	0	100	15
Conduct a pilot study for the experiments; finalize experiment procedures	10	0	100	10
Conduct formal laboratory experiments	10	5	100	10
Perform data processing and statistical analysis for the laboratory experiments	10	20	100	10
Task 5: Technical Memorandum on the driver manual chapters, exam questions and answers	10	10	100	10
Task 6: Prepare and deliver the final report	10	20	80	8
Final Report				
TOTAL	100 %			98.0 %

Project Objectives:

The overall objective of this study is to conduct a human factors survey to understand drivers and pedestrians behavior and perceptions at various types of railroad and light rail crossings, and determine their understanding of different types of traffic control devices. This understanding would help the Diagnostic Team to take necessary steps to improve the safety of railroad and

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light rail crossings, and also determine the appropriate information that should be included in the driver manuals.

Project Abstract:

To improve the safety at railroad and light rail crossings, this project will study driver perceptions and behavior at railroad and light rail crossings, and develop a new driver manual section that will provide the reader with clear and concise information about different types of railroad/light rail crossings and the appropriate response under these situations.

This study has three distinct parts. The first part, tasks 1, 2, and 3, will involve the classification of railroad/light rail crossings and traffic control devices and a survey of other states and their driver manuals. The second part, task 4, will involve a human factors experiment to study driver behavior and perceptions at different types of crossings with different types of traffic control devices. The outcomes of task 4 will help to understand how different drivers and pedestrians respond to various warning devices at different types of railroad/light rail crossings in New Jersey. The final part, task 5, will utilize the information from tasks 1 through 4, to develop a new section pertaining to railroad/light rail crossings for the New Jersey Driver Manual, the Commercial Driver Manual, Motorcycle Driver Manual, and Motorized Bicycle Driver Manual. Test questions will be generated from the new section and recommended for adopting into future driver tests.

1. Progress this quarter by task:

The research team on this project completed statistical analyses for testing the draft railroad section of the NJ driver manuals. It was observed that:

For General Driving Test Questions-

Subjects with driver license performed significantly better than subjects without driver license ($p < .01$). There was no performance difference between subjects in the experimental group (railroad crossing section) and subjects in the control group (regular driver manual) ($p < .05$).

For Questions pertaining to railroad crossings-

Subjects with driver license performed significantly better than subjects without driver license ($p < .01$). Subjects in the experimental group (railroad crossing section) performed significantly better than subjects in the control group (regular driver manual) ($p < .05$).

Results of the project indicated that drivers in the state of New Jersey can benefit from having a dedicated section in their driver manuals about safety behaviors and better understanding toward railroad and light rail warning

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devices at grade crossings.

The final report of the project will be submitted within the deadline of the project.

2. Proposed activities for next quarter by task:

This is the last quarter for the current project. The final report will be submitted within this quarter.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$160,000.00
Modified Contract Amount	
Total Project Expenditure to date	\$100,577.00
% of Total Project Budget Expended	62.86%

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QUARTERLY PROGRESS REPORT**

Project Title: Fatigue Management, Rail Operations Personnel - Year II	
RFP Number: 36	NJDOT Research Project Manager: Karl Brodtman, NJDOT
Task Order Number/Study Number: TO-36	Principal Investigator: Jeng, One-Jang
Project Starting Date: 1/1/2002	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2003	Period Ending Date: 6/30/2004
Modified Completion Date: 6/30/2004	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase I : Literature Search	5	0	100	5
Phase II : Research Approach Task 1 : Detailed Literature Search	10	0	100	10
Task 2: Presentation of Literature Findings	5	0	100	5
Task 3: Determine Existing HOS guidelines	25	0	100	25
Task 4: Prepare HOS model for Crew Schedule Assessment and Design Tool	30	15	100	30
Task 5: Prepare a Request for Proposal	15	20	90	13.5
Task 6: Reporting	10	20	90	9
Final Report				
TOTAL	100 %			97.5 %

Project Objectives:

Project Objective: The primary objectives of this project are to review current fatigue management strategies, evaluate existing hours of service (HOS) guidelines for NJ Transit rail operations personnel and develop a computer interface which can be integrated into NJTransit's existing scheduling software. The results of this project aim at minimizing fatigue for NJ Transit Rail Operation's personnel and are intended to improve safety and reduce the turnover of skilled rail operations personnel in NJ Transit.

Project Abstract:

Operator fatigue is and will continue to be an important safety issue in the railroad industry. In a cover letter submitted along with the Federal Railroad Safety Enhancement Act of 1999 bill to the U. S. House of Representatives and Senate, U.S. Department of Transportation Secretary Rodney E. Slater states that "fatigue hampers the alertness of employees and causes accidents, one of the most pervasive safety issues in the railroad industry"

"Fatigue Management Plans" provide scheduling strategies that consider the human body's natural sleep/wake cycles (circadian rhythm) to optimize service and/or production while minimizing costs. Under provisions of the Federal

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Railroad Safety Enhancement Act of 1999 bill, Fatigue Management Plans amend the existing hours of service laws under the current United States Code. These changes are aimed at recognizing and reducing on-the-job fatigue and fatigue-caused accidents and injuries.

In its continuing efforts to improve safety and reduce the turnover of skilled operating personnel, NJ Transit, the state principal transit service provider and the New Jersey Department of Transportation (NJDOT) have initiated a project to evaluate NJ Transit's existing Hours of Service (HOS) guidelines and develop a computer model aimed at minimizing operator fatigue. NJ Transit maintains an HOS database for 365 rail engineers and 267 assignments. It is NJ Transit's desire to use this database and compare this to HOS determinations using existing Fatigue Management models. The guidelines developed out of these efforts must be credible and practical in terms of reducing fatigue, meeting applicable rules and regulations, addressing management and staff personnel concerns and meeting current and future demands of NJ Transit's rail passenger customers.

1. Progress this quarter by task:

Fatigue survey/questionnaires were distributed and the survey results are being electronically compiled by CTI. We will also finalize the report once the survey results have been compiled. Survey respondents also provided written comments, which have been incorporated into the draft report.

CTI and NJIT are also preparing the Request for Proposal document and will meet with Alex Baker, the project customer, once this document has been completed.

2. Proposed activities for next quarter by task:

Revisions, edits to the Final Report and/or Request for Proposal document, if necessary.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$185,598.00
Modified Contract Amount	
Total Project Expenditure to date	\$180,618.00
% of Total Project Budget Expended	97.32%

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Project Title: Improving Public Transit Schedules, Timetables People Can Actually Read	
RFP Number: 22-2002	NJDOT Research Project Manager: Edward Kondrath
Task Order Number/Study Number: TO-38	Principal Investigator: Fallat, George Alexander
Project Starting Date: 01/01/2003	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2003	Period Ending Date: 6/30/2004
Modified Completion Date: 06/30/2004	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Task 1, Phase 1 – Literature Search	10	0	100	10
Task 1, Phase 2. Presentation of Literature Review Findings	5	0	100	5
Task 2: Develop a Proposed Methodology	10	25	100	10
Task 3: Apply New Wayfinding Methods	10	10	100	10
Task 4: Administer Survey	15	50	100	15
Task 5 – Compile Survey Results	10	25	100	10
Task 6 – Prepare Guidelines	20	75	95	19
Task 7 - Reporting	20	20	95	19
Final Report				
TOTAL	100 %			98.0 %

Project Objectives:

The primary objective of this research project is to develop and improve the communication of schedule information to existing and potential NJTransit bus riders. It is anticipated that by making it easier to read and comprehend schedule information, automobile users will be encouraged to use transit thereby reducing congestion and fuel consumption and improve air quality. For current users, improving the visual display of transit schedules can help ease the difficulty and frustration of implementing future schedule changes.

Project Abstract:

There has been extensive research on effective methods for visual information presentation that has lead to the establishment of useful principles for implementation. In Human Factors in Engineering and Design, Sanders and McCormick (1993) discuss a number of important visual display features, including typography (e.g. stroke width, font type, size), layout (interletter spacing, interline spacing, logical grouping and layout of information.), color, and information grouping. In his book titled “The Visual Display of Quantitative Information”, Tufte (1983) uses many examples of good and poor designs to illustrate important factors for quantitative visual presentations.

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Through these and other references as well as feedback from customer surveys, the research team proposes to (1) determine how well current timetables serve both bus riders and non-bus users; (2) identify the major deficiencies in the current timetable design and (3) develop more effective layout schemes.

1. Progress this quarter by task:

Subject performance testing of the prototypes was completed and the results have been compiled. The project team is meeting on May 26 to review the survey results and finalize recommended schedule guidelines. NJIT is also preparing the final report, Tech Brief and electronic files for final submission.

2. Proposed activities for next quarter by task:

A second draft report will be submitted this quarter and changes will be incorporated. No additional activity is anticipated after this quarter.

3. List of deliverables provided in this quarter by task (product date):

Task 1. Draft Literature Search submitted. Task 2. Detailed literature submitted.
Task 3. Focus group sessions completed and draft meeting minutes prepared.

4. Progress on implementation and training activities:

None to date

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$117,622.00
Modified Contract Amount	
Total Project Expenditure to date	\$85,017.00
% of Total Project Budget Expended	72.28%

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Project Title: Mobility Information Needs of Limited English Proficiency People In NJ - Year II				
RFP Number: 2002-20		NJDOT Research Project Manager: Ed Kondrath, New Jersey DOT		
Task Order Number/Study Number: TO-39		Principal Investigator: Liu, Rachel		
Project Starting Date: 1/1/ 2003		Period Starting Date: 4/01/2004		
Original Project Ending Date: 06/30/2004		Period Ending Date: 6/30/2004		
Modified Completion Date: 12/31/2004				

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Review	10	100	100	10
Identify Source of Information on LEP Groups	5	100	100	5
Identify and Classify the NJLEP population	5	100	100	5
Survey of LEP population	10	90	100	10
Survey of transit agencies	10	20	100	10
Survey of international oriented activity centers	10	90	100	10
survey of selected international transit agencies	10	90	100	10
Nonverbal Communication Approaches	10	60	60	6
Synthesizing Verbal and Nonverbal Communication Approaches	10	50	50	5
Synthesizing w/LEP market Research	10	50	50	5
Quarterly and Final Report	10	20	40	4
Final Report				
TOTAL	100 %			80.0 %

Project Objectives:

1. Provide residents and travelers in New Jersey who have limited English proficiency with the ability to gain essential access to New Jersey's transportation opportunities, such as bus, rail, road, water and air. Unique in the United States, New Jersey has only one transit agency, NJ Transit, for all modes of Public Transportation in the state. This unique organizational structure will help to afford comprehensive and consistent solutions for public transportation infrastructure systems as well as better management and customer services for the traveling public. This research should assist NJT maintain and improve the quality of transit services.
2. Further New Jersey transportation agencies' compliance with Title VI regulations as they pertain to the avoidance of discrimination against people of different national origins or language proficiency.
3. Provide NJ Transit and NJDOT with a manual to be used in recommending ways of improving their service to the LEP population in New Jersey.
4. Pay particular attention to the cost and cost effectiveness

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information of individual practices gathered in the survey. The research team will present an evaluation of each technique in terms of cost and time frame of implementation so NJ Transit will be able to select the most cost-effective methods in a timely manner to serve the LEP population in New Jersey.

Project Abstract:

Charged to Further New Jersey transportation agencies' compliance with Title VI regulations as they pertain to the avoidance of discrimination against people of different national origins or language proficiency. This research will provide NJ Transit and NJDOT with a manual to be used in recommending ways of improving their service to the LEP population in New Jersey. Pay particular attention to the cost and cost effectiveness information of individual practices gathered in the survey. The research team will present an evaluation of each technique in terms of cost and time frame of implementation so NJ Transit will be able to select the most cost-effective methods in a timely manner to serve the LEP population in New Jersey.

1. Progress this quarter by task:

To date, we have conducted literature review and are in the process of composing the literature review Technical Memorandum.

We also searched the data sources of LEP population, and contacted various groups for future survey

2. Proposed activities for next quarter by task:

Conduct surveys of community groups in NJ and analyze the mobility information needs of such groups

3. List of deliverables provided in this quarter by task (product date):

Technical Memorandum on demographics of LEP travelers in NJ

4. Progress on implementation and training activities:

In Progress

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$230,393.00
Modified Contract Amount	
Total Project Expenditure to date	\$132,555.00
% of Total Project Budget Expended	57.53%

**NJDOT Bureau of Research
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Project Title: Survey of Transit/Rail Freight Interactions				
RFP Number: 2002-19		NJDOT Research Project Manager: Nancy Ciarufolli, NJ DOT		
Task Order Number/Study Number: TO-40		Principal Investigator: Liu, Rachel		
Project Starting Date: 1/1/2003		Period Starting Date: 4/01/2004		
Original Project Ending Date: 12/31/2003		Period Ending Date: 6/30/2004		
Modified Completion Date: 3/31/2004				

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Review	10	100	100	10
Survey of Peer Transit Agencies	40	100	100	40
key factors of successful interaction	30	100	100	30
Case studies	10	100	100	10
Final Report	10	100	90	9
Final Report				
TOTAL	100 %			99.0 %

Project Objectives:

- 1.Survey transit entities around the nation and identify the best practices for passenger and freight rail interactions.

- 2.Identify impediments, including legal, administrative and physical, that hinder shared use of freight and passenger rail service.

- 3.Produce a catalog that may be referenced by the NJT staff to develop strategies for rail network expansion and negotiation with freight railroad.

- 4.Reveal the key factors that contribute to the successful interactions between freight railroad and transit operators

- 5.Highlight a few selected agencies, approaches, or “hot leads? that may be investigated further, should NJ Transit deem necessary, to prepare the negotiation with freight railroads.

Project Abstract:

To provide NJDOT and NJ Transit with a stronger position at the negotiation table, the research team is charged to survey transit entities around the nation and identify the best practices for passenger and freight rail interactions. This research will also Identify impediments, including legal, administrative and physical, that hinder shared use of freight and passenger

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rail service. The product of this research will be a catalog that may be referenced by the NJT staff to develop strategies for rail network expansion and negotiation with freight railroad. The catalog will Reveal the key factors that contribute to the successful interactions between freight railroad and transit operators and Highlight a few selected agencies, approaches, or “hot leads? that may be investigated further, should NJ Transit deem necessary, to prepare the negotiation with freight railroads.

1. Progress this quarter by task:

To date, we have conducted literature and are in the process of compiling the technical memorandum documenting the literature gathered and topics that pertinent to this research project.

2. Proposed activities for next quarter by task:

Survey transit systems composed of various commuter rail, light rail, and havey rail systems around the United States. One of the concentrated surveys will be conducted at the APTA commuter rail conference

3. List of deliverables provided in this quarter by task (product date):

Technical Memorandum of Literature Review

4. Progress on implementation and training activities:

IN progress

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$99,910.00
Modified Contract Amount	
Total Project Expenditure to date	\$82,712.00
% of Total Project Budget Expended	82.79%

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Study to Determine the Need for Innovative Concept of Container Transportation System				
RFP Number:		NJDOT Research Project Manager: Dr. Nazhat Aboobaker		
Task Order Number/Study Number: TO-44		Principal Investigator: Spasovic, Lazar		
Project Starting Date: 01/01/2003		Period Starting Date: 4/01/2004		
Original Project Ending Date: 12/31/2003		Period Ending Date: 6/30/2004		
Modified Completion Date: 06/30/2004				

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Task 1: Literature Search	10	0	100	10
Task 2: Screening Evaluation	20	0	100	20
Task 3: Optimal System Design Selection Framework	30	0	100	30
Task 4: Case Studies of Selected Technologies	30	30	100	30
Task 5: Training and Implementation	10	0	0	0
Final Report				
TOTAL	100 %			90.0 %

Project Objectives:

The objectives of this study are three-fold:

- 1) Outline and analyze the factors (port space utilization, market demand, congestion, etc.) that are creating the need for new, non-truck related marine container freight transfer systems at new Jersey Port facilities. This objective consists largely of identifying the needs and applications for innovative freight container movement systems. This objective will be addressed through information gathering and assimilation of existing available freight related data.
- 2) Present examples of innovative systems used at other ports or under development that can be used at NJ Ports to increase the efficiency and velocity of moving containers from terminal to off dock container freight stations and to active distribution centers, which represent the economic development opportunities for host communities. This objective is intended to be met through a comprehensive literature review effort and a detailed comparison and evaluation of various freight container mover technologies. Research team has also proposed use of case studies to demonstrate the feasibility of specific applications. Case studies can also provide host communities with a better understanding of the impacts of implementing innovative freight container mover technologies and comparing these with other conventional transport modes.
- 3) Prepare a list of issues and performance criteria that must be addressed to

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advance development of monorail (or other innovative container mover technology) final implementation at port Newark-Port Elizabeth and other NJ ports. The intention is to use case studies in meeting this objective.

Project Abstract:

New Jersey ports have been experiencing tremendous growth in container volumes in recent years and it is anticipated that this trend will continue in the future. This may present a problem for the transportation network supporting the traffic coming to and from the port facilities. Currently most of the containers are brought to and picked up from the port by trucks and, while approximately 10% of containers are handled by trains. Projected growth in container traffic along with expected growth of commuter traffic in the region will cause more than significant increase in congestion which will ultimately completely deteriorate performance of the transportation system in the region as well as performance of the transportation network around ports and within the port terminals themselves. In this situation port authority and port operators look for the ways to avoid problems that can emerge as the result of the traffic growth. One way to do so is to investigate the feasibility of using innovative transportation modes as the alternative to trucks and trains. This study will identify technologies that should be considered as candidates for container movement from and to the port, considering different travel distances. Economic analysis show whether these technologies are feasible or not, but it also evaluates external effects of the applied technology, such as pollution, reduction in congestion, noise, landuse disruption, etc.

1. Progress this quarter by task:

Decision matrix has been revised to reflect comments and suggestions by the RPSIP. Selected technologies have been analyzed for each case study, including sensitivity analysis. Geo-technical analysis of the study area has also been completed. GIS database with geo-technical and geological information gathered as the part of the study will be submitted as one of the project deliverables. Project team has also been working on the final report. Draft report was submitted and is now being revised following comments and suggestions by the reviewers.

2. Proposed activities for next quarter by task:

Project team will handle revisions to the final report if needed. Technical presentations of the project findings will be scheduled for interested parties in coordination with NJDOT.

3. List of deliverables provided in this quarter by task (product date):

N/A

4. Progress on implementation and training activities:

N/A

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5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$100,084.00
Modified Contract Amount	
Total Project Expenditure to date	\$95,500.00
% of Total Project Budget Expended	95.42%

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Project Title: Economic and Quality of Life Impacts of Route 21 Freeway Construction - Year III	
RFP Number: 2001-08	NJDOT Research Project Manager: R Sasor
Task Order Number/Study Number: TO-35	Principal Investigator: Golub, Eugene
Project Starting Date: 01/01/2002	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2006	Period Ending Date: 6/30/2004
Modified Completion Date:	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase I: Literature Review	3	0	100	3
Task 1: Pre-construction, economic conditions	4	0	100	4
Task 2: Familiarization with Route 21	4	0	100	4
Task 3: Familiarization with Context Design	4	0	100	4
Task 4: Familiarization with Baseline data	4	0	100	4
Task 5: Develop study methodologies	75	2.5	37.5	28.125
Task 6: Prepare interim annual reports	3	1	46	1.38
Task 7: Prepare quarterly / final reports	3	5	40	1.2
Final Report				
TOTAL	100 %			49.7 %

Project Objectives:

The objectives of this study as set forth in the RFP are to:

- (1) Determine the economic and quality of life impacts of the Route 21 missing link freeway construction on the communities it traverses.
- (2) Determine these impacts by using simple indicators that show evidence of change in economic conditions or quality of life.
- (3) Follow up on the baseline data collected in 2001 by NJDOT staff, by collecting information on the same indicators and public spaces once each year in Years 2002-2006; thereby, evaluating these impacts over a five year period.
- (4) Evaluate the communities' reaction to the "Context Sensitive Design" initiatives taken for this highway project, which utilized extensive CSD elements to enhance the quality of public space.
- (5) Evaluate the impacts on traffic volumes and characteristics of removing traffic from local streets.

Project Abstract:

Opened to traffic in December 2000, the "missing section" of the Route 21 Freeway in Clifton and Passaic (Hope Ave. to the Rt. 46 Interchange) was designed utilizing the "equivalent" to the CSD approach at that time and will

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be the highway project used for the evaluation of CSD. A great deal of planning and design work was done to enhance the quality and appearance of this roadway and to maximize positive impacts on and for the surrounding communities.

This research project will evaluate over a five year period how effective the CSD approach was in the design of the Route 21 Freeway. The evaluation will focus on economic and quality of life issues. The type of economic issues that may be reviewed include impacts on neighborhood, residential real estate values, the success of commercial enterprises in the area, demographic characteristics in the area, traffic safety, workload to police, fire, hospitals and other municipal services. The type of quality of life issues that may be reviewed include: impacts on noise in the neighborhood, air quality, aesthetics and viewscape, traffic flow and other factors of concern to the local population.

Public perception initially and over a five year period will be measured by surveys to be taken each year of the project. This is a most critical element in the study because success ultimately must be “seen” by the impacted public literally and figuratively. In addition, traffic counts will be taken to determine changes from pre-construction to post-construction conditions and variations over the five years of the study. Other published data and modeling will be utilized to measure changes in economic and quality of life impacts.

1. Progress this quarter by task:

Phase1 The literature search is complete.

Task3 Familiarization with CSD is almost complete. Additional work includes discussion with other NJDOT personnel as to how CSD was applied on this project.

Task2 Familiarization with the Rt 21 design and Baseline Data is complete. The NJDOT data has been obtained and has been reviewed. Additional data is being developed from other local and County Sources.

Task4 The project team has completed review of NJDOT 2001 baseline data.

Task5 A photographic record of the project has been undertaken and is near completion. It includes photoscapes of the area in proximity of the project as well as photos of the areas thought to be of importance by the NJDOT. these records are compiled on CD's.

Professional staff from both communities were individually interviewed and a compilation is being developed. Further, the local merchant associations have likewise been interviewed.

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Surveys have been sent to elected officials & professional staff in both municipalities. Individual surveys are being conducted with merchants in both municipalities.

Traffic counts are being conducted at key intersections as per NJDOT original studies.

Noise readings are being taken at key locations as per original NJDOT studies.

Data is being compiled for Clifton on all sales of properties and the variation in prices as well as the total assessed valuation of the town for the last 10 years. Similar data has been requested from Passaic.

Accident data in the two towns is in the process of being developed to demonstrate changes that have occurred in the last few years.
Additional photography has been taken at important locations.
Base photographic record is being digitized for a permanent record that is easily organized.
We are obtaining sales reports from City of Passaic.
Surveys have been digitized and analyzed.
An interim annual report has been submitted in draft form. This has been finalized this quarter.

The photographic record taken during the project has been digitized and is in the process of being organized into a usable computer file.

Planning for the second year analysis and data gathering has been completed.
The photographic record taken during the project has been digitized and has been organized into a usable computer file.
The Interim Annual Report has been reviewed by NJDOT, Clifton & Passaic and their comments included in the report.

Interviews were obtained from businesses along Main Avenue in both Passaic & Clifton.

A photographic record was taken along South St in Passaic.

State accident data was obtained for Clifton & Passaic.

Sales data of properties in Passaic & Clifton.

2004-1 qtr

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Analysis of accident data, and sales data on real property has been undertaken. Attempts were made to conduct in person surveys of homes along the Rt 46 corridor. This was not feasible and so the surveys were mailed to the homes.

2qtr

The accident data has been placed in a usable form and is being analyzed.

Data at critical intersections is being obtained with regard to traffic.

The interim annual report has been revised as to form.

2. Proposed activities for next quarter by task:

Analysis of accident data, and sales data on real property will continue.

Traffic counts will be obtained at key locations to measure improvements as predicted by the original studies. Additional surveys will be conducted with individuals who were active in the project design and discussion.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$178,819.00
Modified Contract Amount	
Total Project Expenditure to date	\$113,818.00
% of Total Project Budget Expended	63.65%

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Good Neighbor Privacy Fence - Year II				
RFP Number:		NJDOT Research Project Manager: R Sasor		
Task Order Number/Study Number: TO-34		Principal Investigator: Golub, Eugene		
Project Starting Date: 01/01/2002		Period Starting Date: 4/01/2004		
Original Project Ending Date: 12/31/2003		Period Ending Date: 6/30/2004		
Modified Completion Date:				

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
phase 1- Literature review	8	0	100	8
Task 1: Partner with industry	8	0	100	8
Task 2: Contact industry	15	0	100	15
Task 3: Design details	20	10	100	20
Task 4: Construction guidelines	20	50	100	20
Task 5: Complete guidelines	20	70	100	20
Task 6: Prepare report	4	40	100	4
Final Report	5	60	100	5
TOTAL	100 %			100.0 %

Project Objectives:

The objectives of this study are to:

1. Design a low height, "Good Neighbor" privacy fence that can be erected quickly and simply without the use of major equipment and one whose design does not require engineering inputs for installation.
2. Design this 7-8 foot high privacy fence so that it is low maintenance or maintenance free for its life cycle of approximately 50 years, and is reasonable in cost.
3. Design this privacy fence so that it provides adequate visual screening, is aesthetically appropriate, and does not create the misconception that it provides a noise benefit.

Project Abstract:

Project Abstract: Privacy fencing has the potential for improving the quality of life for neighbors of our highways. In keeping with NJDOT's Good Neighbor Program, for situations where noise barriers are not required or feasible, there is a need for low height fencing that can provide a visual screen. Privacy fencing which is typically limited to 7-8 feet in height is a

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lightweight, non-engineered installation which is not designed to provide noise mitigation. Fencing such as wood, chain link, concrete, and metal have often not provided adequate visual screening, were below standard aesthetically, were difficult to construct, had a short useful life, or required an unacceptable level of maintenance. Highway privacy fencing needs to provide an acceptable level of aesthetics, for both the property owner and the highway user, as well as being able to resist the harsh road salt environment it will be exposed to in New Jersey.

1. Progress this quarter by task:

Project Progress: The literature search is complete.

Detailed information has been gathered on vinyl, concrete, fiberglass, steel, aluminum, block and landscape fences.

The team is also considering the approach of providing fencing on NJDOT property by providing an easement to the adjoining neighbor to select the type of fence from an approved list and then accepting responsibility for maintenance. This would allow for the use of landscape features that require routine maintenance that is then provided by the adjoining homeowner.

An interim annual report was written this quarter. This brought all of the information gathered in a single document. The various solutions studied were discussed in detail and identified as feasible or not feasible.

2004 1qtr:

The project is in its final review by NJDOT staff.

2. Proposed activities for next quarter by task:

Submit final report.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$101,090.00
Modified Contract Amount	
Total Project Expenditure to date	\$93,905.00
% of Total Project Budget Expended	92.89%

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Effectiveness of Bus Nubs for Bus Stops - Mod.1	
RFP Number: 2000-25	NJDOT Research Project Manager: Vincent Nichnadowicz
Task Order Number/Study Number: NCTIP-43	Principal Investigator: Daniel, Janice R.
Project Starting Date: 1/02/2002	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/30/2003	Period Ending Date: 6/30/2004
Modified Completion Date: 6/30/2004	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Task A. Perform a literature review.	5%	0	100%	5%
Task 1. Identify a limited number of urban bus stop locations that could be considered for bus nub installation.	10%	0	100	10%
Task 2. Develop from the literature or elsewhere a specification document that provides measurements and guidance for proposed test bus nubs to be built.	10%	0	100	10%
Task 3. Prepare plans in sufficient detail for the agreed upon test nubs to allow for contractor installation.	5%	0	70	3.5%
Task 4. Develop a methodology to evaluate effectiveness of the alternate	5%	0	100	5%
Task 5. Conduct a before data collection	10%	20	120	12%
Task 6. Install bus nubs.	20%	0%	0%	0%
Task 7. Conduct an after data collection.	10%	0%	0%	0%
Task 8. Analyze the data.	10%	10	107	10.7%
Task 9. With the assistance of NJDOT and NJ Transit, develop for general publication a document explaining the rules and guidelines for the use of	5%	0%	0%	0%
Task 10. Prepare a project schedule to submit a quarterly, interim and final report that document the entire research effort.	10%	0	20%	2%
Final Report				
TOTAL	100 %			58.2 %

Project Objectives:

The objective of this research is to determine the effectiveness of and safety risks associated with bus nubs. The research will focus on the following: (1) Identifying and evaluating factors under which bus nubs result in changes in travel speeds for both buses and other vehicular traffic; (2) Assessing factors that impact the safety risks of bus nubs for drivers and bus passengers compared to conventional bus stops; (3) Determining the impacts of the bus

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nubs on passenger comfort; and (4) Developing guidelines and procedures for the implementation and use of bus nubs in New Jersey.

Project Abstract:

Bus nubs represent one type of bus stop design that is appropriate for use under certain transit, roadway and sidewalk conditions. Under this design, the sidewalk at an intersection is extended into the street to a distance equal to the depth of a typical parallel parking space. Buses stop in the traffic lane instead of weaving into and out of the bus stop. Bus nubs create additional space to include bus stop amenities such as shelters and benches and also reduce the crossing distance of pedestrians at the intersection. The primary motivation for installing bus nubs is to reduce sidewalk congestion and to improve transit operation by reducing bus delays through the elimination of bus-weaving maneuvers into and out of a curbside bus stop. The objective of this research is to determine the effectiveness of and safety risks associated with bus nubs. Bus nubs will be installed at locations in New Jersey. A field evaluation of roadway and sidewalk conditions at the bus nub location before and after installation will be performed. Users of the bus nub will be surveyed to determine the perception of the effectiveness of the bus nub for varying user groups.

1. Progress this quarter by task:

During the past quarter the research team has continued to visit locations identified by NJ Transit to collect re-entry delays. The results of the site visits were documented and are being included in the revised Draft Final Report.

2. Proposed activities for next quarter by task:

The research team anticipates completing the revised Draft Final Report. Any comments received from NJDOT/NJ Transit will be incorporated in and a Final Report submitted.

3. List of deliverables provided in this quarter by task (product date):

None

4. Progress on implementation and training activities:

None

5. Problems/proposed solutions:

The Tasks and percentage completion of the tasks reflect the original scope of this project. Due to the inability of NJDOT/NJ Transit to construct the bus nubs, the tasks no longer reflect the current focus of the research. The percent complete reflects the completion based on the old list of tasks, but does not reflect the percent completion based on the current focus of the research.

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6. Budget summary:

Total Project Budget	\$124,630.00
Modified Contract Amount	
Total Project Expenditure to date	\$107,093.00
% of Total Project Budget Expended	85.93%

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Study of Optimal Travel Speed Limits for Shared Traffic				
RFP Number: 2002-28		NJDOT Research Project Manager: Nazhat Aboobaker		
Task Order Number/Study Number: TO-43		Principal Investigator: Yang, Jian		
Project Starting Date: 01/01/2003		Period Starting Date: 4/01/2004		
Original Project Ending Date: 12/31/2003		Period Ending Date: 6/30/2004		
Modified Completion Date: 06/30/2004				

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase 1. Literature Review	10	0	100	10
Task 1. Review Current Speed Limit Criteria	10	0	100	10
Task 2. Compare NJ Speed Limit Criteria to Others	10	0	100	10
Task 3. Review Attributes for Low-speed Roads	10	0	100	10
Task 4. Assess Data	15	0	100	15
Task 5. Identify Speed Factors	15	0	100	15
Task 6. Establish Procedure for Setting Speeds	10	0	100	10
Task 7. Identify Locations for Implementation	10	0	100	10
Task 8. Final Report	10	5	95	9.5
Final Report				
TOTAL	100 %			99.5 %

Project Objectives:

The overall objective is to determine the optimal speed limit to enhance safety of bicyclists and pedestrians on shared-use roadways. Specific objectives in the proposed research include:

- 1) Determine if the 25-mph speed limit addresses safety needs of bicyclists and pedestrians sharing roadway with vehicles.
- 2) Recommend a method to assess and set speed limits for shared use of public right of way by motor vehicle, bicycle and pedestrian traffic.
- 3) Recommend optimum speed limits for shared use bicycle/motor vehicle traffic in terms of different perspectives for low volumes, low speeds, and road geometry.

Project Abstract:

The congressionally mandated National Bicycling and Walking Study has set goals to: (1) double the percentage of all trips made by bicycling or walking; and (2) to reduce the current number of bicycling and walking injuries and fatalities by 10 percent. One approach to enhancing the safety of bicyclists and pedestrians is to ensure safe operating speeds on residential and commercial roadways by identifying appropriate speed limits for shared roadways

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or roadways that accommodate motor vehicles, pedestrians and bicycles. Motor vehicles, pedestrians and bicycles share the same right-of-way in conditions where sidewalks or a bicycle path is not provided. These conditions occur in rural areas where sidewalks in general are not provided, or in urban areas with insufficient width or no anticipated pedestrian traffic. In lightly travelled rural roadways and suburban streets with an average annual daily traffic (AADT) less than 1200 vehicles per day, neither sidewalks nor shoulders may be required. This forces pedestrians even closer to the active travelway.

Although guidelines are provided on the geometric design of shared-use roadways, little research has been performed on the appropriate speed limit for these roadways to ensure safety to all users of the roadway. In New Jersey, current regulations require the use of the low statutory speed of 25 mph in residential and business districts. No research has been performed, however, to determine whether this speed is appropriate on roadways in these districts where pedestrians and bicycles share the travelway with motor vehicles. Research has shown substantial reduction in the severity of injuries and number of fatalities when the vehicle is traveling at less than 25 mph. The proposed research examines current criteria and procedures used for setting speed limits and develops an approach to determine appropriate speed limits for shared use of public rights of way by motor vehicle, bicycle and pedestrian traffic.

1. Progress this quarter by task:

During the past quarter the research team has reviewed the Draft Final Report submitted in April, 2004 to the Research Panel. The team continues to revise areas needing further explanation or correction. The research team also participated in a continuing education course presented in the afternoon session for the Institute of Transportation Engineer's MET Meeting. The topic of the course was on "Developing Optimal Speeds for Multi-Modal Roadways". The procedures developed for determining optimal speed limits in this research were presented. Students taking the course received continuing education credits.

2. Proposed activities for next quarter by task:

The research team anticipates completing the Final Report. The team will concentrate on the formatting of the Report to make it consistent with NJDOT guidelines.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

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Total Project Budget	\$136,688.00
Modified Contract Amount	
Total Project Expenditure to date	\$109,629.00
% of Total Project Budget Expended	80.20%

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Project Title: Assess Impacts and Potential Benefits of Traffic Signal Priority for Buses	
RFP Number: 2000-28	NJDOT Research Project Manager: Nick Vitillo
Task Order Number/Study Number: NCTIP-45	Principal Investigator: Daniel, Janice R.
Project Starting Date: 1/02/2002	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2002	Period Ending Date: 6/30/2004
Modified Completion Date: 06/30/2004	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase I. Assemble, Review & Synthesize Literature	10%	0	100%	10%
Task 1. Survey Existing Systems Using Priority	15%	0	100	15%
Task 2. Identifying Promising Locations and Develop Plans	25%	0	100	25%
Task 3. Assessment of Operational Plans	25%	0	100	25%
Task 4. Prepare Reports	25%	5	95	23.75
Final Report				
TOTAL	100 %			98.8 %

Project Objectives:

- To assess the impacts of and the implementation issues associated with the use of bus signal priority in New Jersey;
- To develop operational test plans for implementing signal priority at promising locations; and
- To assess the benefit and costs of signal priority.

Project Abstract:

Traffic congestion is a growing problem not only in this country but all over the world. It is no longer feasible to build our way out of this problem. Encouraging the use of public transportation is one way to reduce congestion. Providing signal priority for transit vehicles has been proposed as one way of keeping these vehicles on schedule, reducing delays to the transit vehicle, and leading to more efficient public transit systems. It is hoped that this would lead more people to use this mode of transportation. Encouraging automobile drivers to switch to public transportation, however, may require that public transportation, such as buses, be given preferential treatment on the roadway. Bus transportation, therefore, should be designed and operated to provide an attractive alternative to auto travel. One measure aimed at improving surface transit movement is through the use of signal priority for buses.

Bus transportation is the most common form of public transportation used in the

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United States accounting for 63 percent of all transit trips (Danaher, 1997). Bus transportation serves many functions including providing basic mobility to the poor and elderly, helping to alleviate automobile congestion and enabling the development of high-density areas with less dependence on automobiles. In recent years, heavier demands have been placed on bus transportation to meet growing mobility needs and environmental goals. The Clean Air Act of 1990 specifically challenges the transportation profession to improve air quality through reduced automobile usage. Increasing the attractiveness of transit service, by improving transit service quality, is an important step towards meeting this goal. To increase transit attractiveness and reduce automobile usage, transit operations must be improved to provide fast, reliable service at acceptable cost.

1. Progress this quarter by task:

During the past quarter, the research team has been involved in editing and revising portions of the Draft Final Report submitted in January, 2004. An assessment of Broad Street was performed attempting to quantify the impact of certain improvements to Broad Street in an effort to improve the benefits of signal priority to the roadway. This assessment is still on-going and the research team hopes to have results for submission to the Draft Final Report.

2. Proposed activities for next quarter by task:

The research team anticipates completing the revision of the Draft Final Report. Any comments received from NJDOT/NJ Transit will be incorporated in and a Final Report submitted.

3. List of deliverables provided in this quarter by task (product date):

Draft Final Report provided at the January 2004 Quarterly Meeting

4. Progress on implementation and training activities:

None

5. Problems/proposed solutions:

None

6. Budget summary:

Total Project Budget	\$138,109.00
Modified Contract Amount	
Total Project Expenditure to date	\$111,381.00
% of Total Project Budget Expended	80.65%

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Project Title: Effectiveness of Certain Design Solutions on Reducing Vehicle Speeds - Year II	
RFP Number: 37	NJDOT Research Project Manager: Nazhat Aboobaker
Task Order Number/Study Number: TO-37	Principal Investigator: Daniel, Janice R.
Project Starting Date: 1/1/2003 Original Project Ending Date: 6/30/2004 Modified Completion Date: 4/30/2005	Period Starting Date: 4/01/2004 Period Ending Date: 6/30/2004

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
PHASE I - Literature Search	15	10	90	13.5
Task 1. Presentation of Findings	5	0	100	5
Task 2. Accident Analysis	20	0	100	20
Task 3. Human Factors Study	40	10	65	26
Task 4. Plan and Budget Development	10	0	0	0
Task 5. Reporting	10	5	20	2
Final Report				
TOTAL	100 %			66.5 %

Project Objectives:

The overall objective of the proposed research is to evaluate the effectiveness of various traffic calming treatments on motorist's speeds. The research will focus on treatments appropriate for commercial and residential areas where speed limits are less than 35 miles per hour. The research will also focus on treatments and study locations to improve the safety of motorists, while maintaining and or improving the safety of pedestrians and bicyclists.

Specific objectives to be accomplished in the proposed research include:

- (1) To identify locations in New Jersey where traffic calming treatments may be beneficial to motorists, bicyclists and pedestrians;
- (2) To determine appropriate traffic calming treatments for these locations; and
- (3) To conduct a human factors study to evaluate the potential benefits and effectiveness of the proposed traffic calming treatment.

Project Abstract:

One of the initiatives of the U.S. Department of Transportation is to increase the use of bicycling and to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas. The congressionally mandated National Bicycling and Walking Study also has set goals to: (1) double the percentage of all trips made by bicycling or walking; and (2) to reduce the current number of bicycling and walking injuries and

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fatalities by 10 percent. One approach to enhancing the safety of bicyclists and pedestrians, is to ensure safe vehicular speeds on residential and commercial roadways through the use of traffic calming measures.

Traffic calming is defined by the Institute of Traffic Engineers as "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users" (Lockwood, 1997). The objective of traffic calming is to reduce the speed and volume of traffic to acceptable levels and to thereby increase the safety of the roadway (Ewing, 1999). The focus of this research is to explore various design solutions that will reduce vehicle speeds, especially in business and residential areas. The intent of the research is to provide a preliminary investigation to identify design solutions and locations where these solutions would be appropriate so that a later field implementation and evaluation of speed-reduction treatments can be conducted.

1. Progress this quarter by task:

During the past quarter, the research team has taken a step back to reevaluate how locations for performing a traffic calming analysis are identified. The original approach taken by the research team was to perform an accident analysis to identify locations with high pedestrian and bicyclist accidents on State routes with a speed limit of 35 mph or less. A subsequent analysis was then performed for the locations with the highest number of crashes to ensure that the crashes were not occurring as a result of light or weather conditions. After completing this review, field visits were made to these locations. The visits showed that many of the locations identified in the accident analysis are routes with substantial volumes during peak hour periods. These roadways would not be suitable for using "traditional" traffic calming measures based on a redesign of the roadway (e.g. speed humps/tables, center island, chicanes) as these types of measures are more appropriate for residential roadways. As a result, the research team has revised the approach used to identify locations appropriate for traffic calming measures and is also revising the types of traffic calming measures considered. Measures such as rumble strips and pavement striping may have better success on some of the State routes being analyzed. The research team is also considering the use of some non-State routes and some non-design traffic calming measures to ensure that ranges of measures are studied.

2. Proposed activities for next quarter by task:

The research team anticipates using the summer months to finalize a procedure for identifying locations, visiting these locations and administering the survey. The survey has been completed and we are now waiting for locations to study. The team anticipates completing the Human Factors portion of the study

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by the end of the summer.

3. List of deliverables provided in this quarter by task (product date):

Technical Memorandum on the national and international literature search.

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$119,126.00
Modified Contract Amount	
Total Project Expenditure to date	\$62,607.00
% of Total Project Budget Expended	52.56%

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QUARTERLY PROGRESS REPORT**

Project Title: Improvement of Continuity Connections Over Fixed Piers - Year III				
RFP Number: 2000-23		NJDOT Research Project Manager: Tony Chmeil		
Task Order Number/Study Number: TO-27		Principal Investigator: Saadeghvaziri, M. A.		
Project Starting Date: 01/01/2001		Period Starting Date: 4/01/2004		
Original Project Ending Date: 12/31/2003		Period Ending Date: 6/30/2004		
Modified Completion Date: 08/31/2004				

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature review	4	0	100	4
FEA work	21	4.7	100	21
Instrumentation/In-field measurements	21	0	100	21
Comparison/FEA	14	14.3	100	14
Recommendations for changes to existing design	9	0	100	9
Interim report	2	0	100	2
New connection	16	10	80	12.8
Laboratory tests	5	10	100	5
Specs.	5	40	60	3
Final report	3	30	30	0.9
Final Report				
TOTAL	100 %			92.7 %

Project Objectives:

A dual-purpose study is proposed to i) improve existing continuity connections and ii) develop new generation continuity connections for prestressed precast girders.

Project Abstract:

This project is concerned with precast prestressed bridge girders made continuous. This is a hybrid type of construction, in which prestressed concrete girders which are designed (for simplicity) for use as simply supported members are connected at supports for continuity providing a structure that is continuous under live load. Such designs have turned out to be effective for many applications and have been used commonly around the US with occasional problems of differential creep and shrinkage resulting in some cases of unwanted cracking. Reliability and difficulty of construction are other issues that demand further investigations. Our study is designed to provide an overview of this type of construction and to make recommendations concerning potential improvements of it for future usage and construction. Furthermore, an innovative continuity connection is proposed for analytical and

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experimental studies, which combines traditional materials and construction practices with advanced composite materials and new design and construction techniques. The proposed continuity connections will have better reliability and serviceability performance, it is more efficient by providing continuity for a larger portion of the total load, and it can also satisfy seismic demand requirements.

1. Progress this quarter by task:

Technical aspect of the application tool is finalized.
Draft final report started.

2. Proposed activities for next quarter by task:

Add documnetation and help to the application tool.
Submit draft final report.
Make final presentation on results to NJDOT.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on implementation and training activities:

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$226,319.00
Modified Contract Amount	
Total Project Expenditure to date	\$189,665.00
% of Total Project Budget Expended	83.80%

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title: Alternate Performance Measures for Evaluating Congestion	
RFP Number: 2001-20	NJDOT Research Project Manager: Nancy Ciaruffoli
Task Order Number/Study Number: NCTIP-41	Principal Investigator: Spasovic, Lazar
Project Starting Date: 01/01/2002	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2002	Period Ending Date: 6/30/2004
Modified Completion Date: 11/30/2003	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Task 1.1 Literature Search	8	0	100	8
Task 1.2 Literature Search Presentation	8	0	100	8
Task 2.1 Current Congestion Data	8	0	100	8
Task 2.2 Existing Performance Data	8	0	100	8
Task 2.3 Existing Congestion Baseline	16	0	100	16
Task 2.4 Labor and Industry Data	8	0	100	8
Task 2.5 Determine Costs of Congestion	16	0	100	16
Task 2.6 Study Program Effectiveness	12	0	100	12
Task 2.7 Quarterly Progress and Final Report	8	0	100	8
Task 3.1 Demonstration/Initial Training	4	15	90	3.6
Task 3.2 Follow-up Training Session	4	0	0	0
Final Report				
TOTAL	100 %			95.6 %

Project Objectives:

The goals of this study are to develop and computer time-based measures that accurately and effectively describe congestion and mobility in New Jersey. It is generally accepted that there is no single measure that will address all aspects of congestion. A group of measures will need to be identified and applied which will convey a "report card" on New Jersey's congestion. This group will need to be easy to compute, easy to comprehend, easy to compare, and easy to update.

Project Abstract:

In 1986, the Federal Highway Administration (FHWA) published the first national comprehensive look at congestion: "Quantification of Urban Freeway Congestion and Analysis of Remedial Measures" (FHWA-RD-87-052, October 1986). This study used the Highway Performance Monitoring System (HPMS) data to estimate and compare the level of congestion for urban areas across the country. This study offered two significant, and at the time, controversial conclusions: congestion affects all urban areas in the country, from the largest to the smallest; and

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congestion could not be addressed solely through new roadway construction. The study estimated the cost of congestion at almost \$10 billion in 1984, growing to over \$50 billion by 2005. A comprehensive plan that would increase supply through new roadway construction as well as reduce demand through transit, ride-sharing and other measures, was needed.

More recently, the Texas Transportation Institute (TTI) produced the "Urban Mobility Study," an annual update to the original FHWA work. The 2001 update found that the cost of traffic congestion nationwide now totals \$78 billion, representing the cost of 4.5 billion hours of extra travel time and 6.8 billion gallons of fuel wasted while sitting in traffic. The average delay is 36 hours per person per year, and the average rush hour trip takes 32 percent longer than the same trip taken during non-rush hours.

In February 2000, NJIT, together with the Foundation for the Alliance for Action, released a report focused on congestion in New Jersey. "Mobility and the Costs of Congestion in New Jersey" applied some of the analysis techniques used by TTI to the more detailed data that was available for New Jersey through the NJCMS. In addition, local data, rather than national averages, were used to better understand the costs of congestion in New Jersey. This study found that congestion impacts all 21 counties statewide; the total cost totaled almost \$5 billion or about \$880 per licensed driver; and that the cost of congestion would double by 2015 if needed state transportation investments in both highway and rail were not made. This study introduced the concept of analyzing transportation improvements using economic analysis techniques such as benefit-cost ratio to better justify transportation investments. The reduction should be seen as an offset to the investment in transportation projects.

In July 2001, NJIT released an updated version of the "congestion study" that used the latest version of the CMS data. The study also utilized other sources of data including NJDOT regional planning models to compute additional time-based measures including: congestion cost per affected person and congestion cost per peak period trip. The study also expanded on the use of economic analysis techniques to compare transportation investments. The results of this study indicated that the cost of congestion in New Jersey had grown from \$5 billion to over \$7 billion due to greater anticipated traffic growth in the congested northeastern region of the state.

This research will use various time-based measures to quantify congestion in New Jersey.

1. Progress this quarter by task:

Phase II

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Task 7: Prepare quarterly progress and final report with appropriate tables, graphs and charts.

The Final Report was finalized, printed, bound and submitted to NJDOT. Additionally, the NJDOT Tech Brief was prepared, printed and submitted to NJDOT. Electronic files of both documents (.doc and .pdf) were also submitted to NJDOT.

Phase III

NJIT has completed assembling the materials necessary for the implementation/training of the congestion program.

2. Proposed activities for next quarter by task:

Phase III - Implementation and training of the congestion program

The initial training will take place during the first week of June and, if necessary, a follow-up session will be scheduled at that time.

3. List of deliverables provided in this quarter by task (product date):

Final Report (10 bound color copies)

NJDOT Tech Brief (10 copies)

CD-ROM containing .doc and .pdf files for both the Final Report and the NJDOT Tech Brief

4. Progress on implementation and training activities:

None

5. Problems/proposed solutions:

None

6. Budget summary:

Total Project Budget	\$85,139.00
Modified Contract Amount	\$100,412.00
Total Project Expenditure to date	\$77,802.00
% of Total Project Budget Expended	91.38%

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Project Title: Computer Modeling and Simulation of New Jersey Signalized Highways - Year II	
RFP Number: 2001-01	NJDOT Research Project Manager: Karl Brodtman, NJDOT
Task Order Number/Study Number: TO-32	Principal Investigator: Chien, Steven I-Jy
Project Starting Date: 01/01/2002	Period Starting Date: 4/01/2004
Original Project Ending Date: 12/31/2003	Period Ending Date: 6/30/2004
Modified Completion Date: 06/30/2004	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Review of Literature and Current Practice	4	0	100	4
Prototype Development	10	0	100	10
Site Identification and Data Collection Needs	10	0	100	10
Data Collection	15	0	100	15
Network Modeling with SYNCHRO and CORSIM	15	10	100	15
Optimization of Signal Timing Plan with SYNCHRO and CORSIM	20	10	100	20
Generation of Traffic Signal Directives	10	30	100	10
Development of Tutorial for the NJDOT Engineers in the SYNCHRO Environment	8	0	100	8
Final Report with Documentation of SYNCHRO Models	8	40	90	7.2
Final Report				
TOTAL	100 %			99.2 %

Project Objectives:

The primary objective of this project is to develop traffic signal timing plans to optimize intersection operation and traffic signal progression for two selected corridors. The methodology developed will be used for these and potentially other selected signalized corridors.

Project Abstract:

Existing computer simulation models can be used to optimize signalized arterial coordination plans as well as individual intersections timing plans. The output from these simulation packages can then be integrated into standard NJDOT traffic signal timing plans for field implementation. Intersection and traffic signal coordination plans should be routinely updated to ensure system optimization. The Project Team proposes to use CORSIM and SYNCHRO software packages and then link the output into a computer spreadsheet. This spreadsheet will be consistent with the NJDOT's standard format and will be formatted for easy field implementation.

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1. Progress this quarter by task:

1. Finalize the optimal signal timing for Rt. 23 corridor. Timing directives have been approved. Report for Rt. 23 is finished.
2. Delivered the modified optimizing timing directives and Synchro files of Rt. 42/322. Report for Rt. 42/322 is under preparation.
3. Prepare final report.

2. Proposed activities for next quarter by task:

1. Submit the final report of this project.

3. List of deliverables provided in this quarter by task (product date):

SYNCHRO 5.0 Networks (Rt 23 and Rt 42/322)
Timing Directives (Rt. 23 and 42/322)
Final Report

4. Progress on implementation and training activities:

done

5. Problems/proposed solutions:

no

6. Budget summary:

Total Project Budget	\$170,260.00
Modified Contract Amount	
Total Project Expenditure to date	\$170,260.00
% of Total Project Budget Expended	100.00%